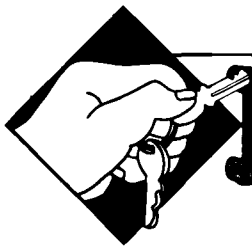

KEY WORDS IN INSTRUCTION

Graphic Inquiry: Skills and Strategies, Part II

by Daniel Callison and Annette Lamb

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Children learn to read pictures before they read words. Unfortunately, we often stop teaching visually once children can read. In the Information Age, it's important to continue to help them interpret the visual world. From books and television to billboards and animation, children are bombarded with graphic images.

Just as children need to learn how to read text, young people also need to learn how to understand visual images. They need skills and strategies for not only reading and comprehending, analyzing and interpreting, using and applying, but also for designing and creating graphics that can be applied to inquiry experiences.

According to Donis A. Dondis in *A Primer of Visual Literacy*, "seeing is a direct experience and the use of visual data to report information is the closest we can get to the true nature of reality" (1973, 2).

Reading and Comprehending Graphics

Like reading a book, students should be able to translate the visual symbols and images in a graphic. They can look for clues to the main idea and supporting information in both the parts and whole of the picture. When reading a photograph, they can ask questions such as:

- What is the main subject?
- If there are people, can they be identified? What is their appearance (i.e., age, gender, race)? What are they wearing? What are they doing? What does their expression tell you? What do you think their lives are like? How are the people in the visual image connected?
- What is the setting? Is it inside or outside? What is the climate, weather, or season? How did the subject get into this situation?
- If there are objects, can they be identified? What is the purpose of these artifacts?
- What is in the background? Is it real or artificial? How do the background objects contribute to the overall setting?
- If the image is divided into nine visual sections, are there additional, close-up details?
- What is the age of the photograph? If not stated, what visual elements provide clues about the age?
- What might be happening beyond the scope of the camera?
- Why did the photographer choose this pose or action to photograph? What is the purpose of this visual?

Thousands of photographs at the Library of Congress can be used to bring history alive. Examine the photo of three women in Figure 1. When could the photo have been taken? What clues in the photo help identify the time period?

Full comprehension of graphics involves not only description, but also explanation and understanding. Picture books can be used to practice comprehension. Wordless books such as *Sector 7* by David Wiesner

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can be used as a basis to ask students to write the story (Clarion, 1997). The book *Right Here on This Spot*, by Sharon Hart Addy, is told visually and examines the changes that take place in a single location over thousands of years (Houghton Mifflin, 1999). Picture books with elaborate borders that tell stories or provide information can also be used. For example, many of the books by Jan Brett, such as *The Mitten*, provide visual clues that anticipate later events in the book (Putnam, 1989).

Increasingly, text resources are being presented by using graphics. For instance, the *Visual Thesaurus* is an interactive dictionary and thesaurus displayed in a visual way to promote exploration (http://www.visualthesaurus.com/). By illustrating the meaning and relationship between words in a graphic format, students can easily identify words to meet their needs. A young inquirer, for example, might start with a question about the difference between responsibility and obligation. A series of clicks on the visual map may help refine his question and lead him to the words, "duty" and "liability." Similar visual tools are being introduced for Internet search engines and other search tools. For example, Grokker can be used to search Yahoo, *Wikipedia*, and Amazon and can be viewed in an outline or map form (http://www.grokker.com). Quintura for Kids is designed specifically for young searchers (http://kids.quintura.com/).

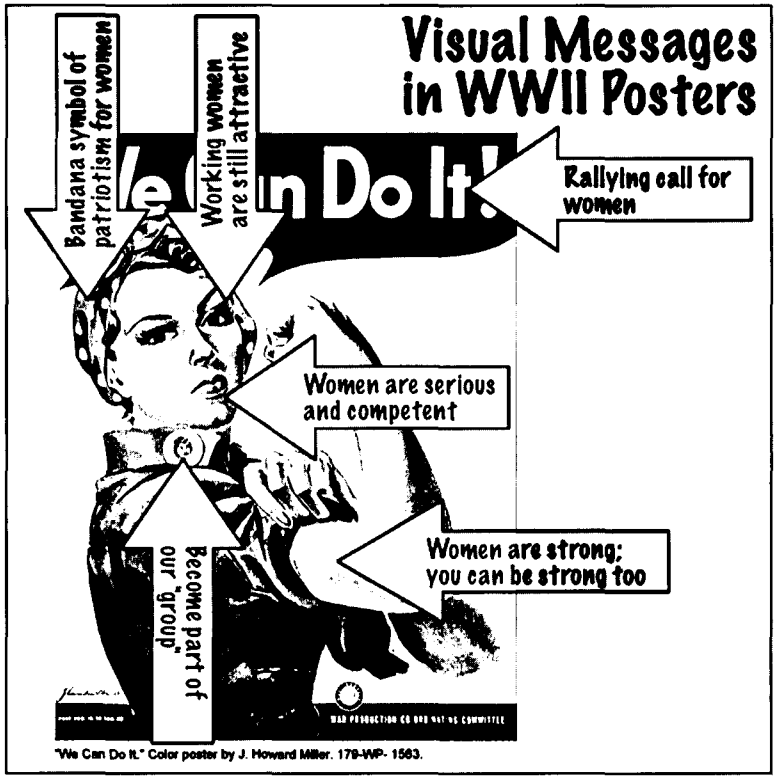
Marcy Driscoll in her book *Psychology of Learning for Instruction* states that "graphic representations have been particularly effective in facilitating encoding and memory storage of information" (2004, 105).

The master student information scientist should be able to effectively read and comprehend a wide range of graphic materials.

Figure 1

Library of Congress, Prints and Photographs Division

Figure 2



"We Can Do It." Color poster by J. Howard Miller. 179-WP- 1563.

Analyzing and Interpreting Graphics

As students gain experience reading graphics, they become increasingly confident in retelling, describing, explaining, and critiquing visuals. For instance, an elementary student might describe the relationships she sees in a diagram showing life on a coral reef. Or, a teenager might identify the persuasive techniques used in a World War II propaganda poster (see Figure 2).

Graphics provide a great starting point for inquiry-based projects. Students can brainstorm questions based on a photograph found at the Library of Congress

website or a chart in a *USA Today* article.

An effective analysis of graphics includes determining the meaning and quality of the visual presentation or argument. In addition, this analysis helps students seek out hidden assumptions, unstated facts, and misleading information leading them to the motives of a creator.

For example, if the topic of respiratory health is being explored, the following questions, criteria, and activities related to analyzing graphic materials can be examined:

Authority. What expertise does the author have in the subject represented by the graphic? Or, what resources did the author use to drawn the conclusions reflected in the graphic? When examining a map showing recent influenza outbreak in North America, it becomes apparent that it was produced by the United States Center for Disease Control (CDC) using data collected from state agencies during the past year. It is concluded that the CDC is an authoritative agency.

Sources. How was this graphic distributed? What individuals or groups support the communication of this information? The chart shows rates of lung cancer, asthma, tuberculosis, and sleep apnea. It is noticed that the chart is posted at an anti-smoking website and comes from the Canadian Lung Association. It is concluded that although the website may contain biased information in support of anti-smoking legislation, the content of the chart comes from a respected authority.

Context. In what setting is this graphic presented? Is it shown with other data representing a particular viewpoint or context? Are particular social, economic, or political agendas associated with the information? Information on rates of tuberculosis is discussed in the article "Health Issues in Africa," and it is determined that the chart is connected with research conducted in Africa by the World Health Organization.

Currency. Is the information in the graphic timely? When was the data collected? While examining a graphic on rates of tuberculosis, it is noticed that no date is provided. Is this historical or current information? Other information is sought to see how it compares to this chart.

Methodology. How was the data for the graphic collected? Was a systematic approach taken to experimentation? Were observations or eye witness reports used? Is the information valid and reliable? While examining the graph, an accompanying note is found indicating that the study tracked 1,000 teenagers during a six-month period to determine their smoking habits.

Assumptions. What are the hidden assumptions and unstated facts about the content of this graphic? Is misleading information conveyed in the graph? After viewing a photograph of a group of people smiling and smoking at a restaurant with the caption "Enjoy Fine Dining," further investigation reveals the group sponsoring the poster is opposed to legislation banning smoking in restaurants.

The mature student information scientist should carefully examine the evidence presented in a graphic, and then determine fact, value, and intent.

Using and Applying Graphics

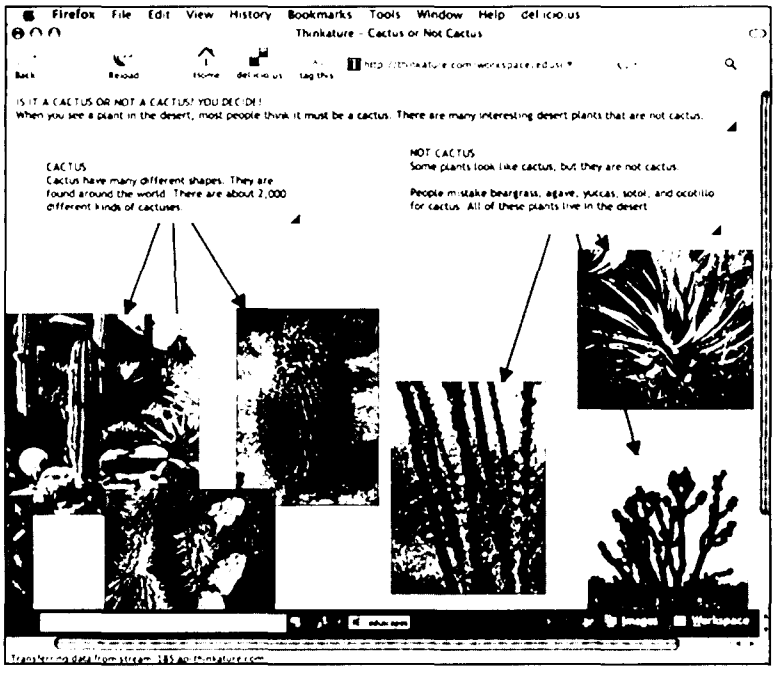
Whether citing a chart as evidence in a debate on stem cell research or incorporating a historical photograph into a presentation on the Great Depression of the 1930s, students should carefully select, use, and apply graphics that best reflect their information needs. To do this, students need to be aware not only of the bias found in graphics, but the importance of considering alternative approaches to the same information. While students may use graphics found in print and electronic sources, they may also create original works and designs to meet a particular need.

Examine the following questions, criteria, and activities related to integrating graphic materials into communications.

Emphasis. What is the central idea represented? Is this a good choice for emphasis? What are the extraneous elements? What are the dominant and subordinate ideas? Highlighting essential features is an effective way to focus on the key ideas, but important elements may be left out. When presenting information about the functions of a human cell, what are the most important parts to illustrate? What differentiates a plant cell from an animal cell? Are the key components of the cell visible and clearly identified in the visual?

Selection. Does the data chosen for a graphic represent the entire population? Or, is it clear that only a particular group is represented? Is criteria provided for the selection of a subset of data? When selecting data for comparison, important examples may be omitted. When creating a graph to show the fat content found in meals at various restaurants, how are the restaurants chosen? Which menu items are represented? When showing population growth worldwide, which countries will be chosen and why?

Figure 3



Proportion. Is all information equally represented? Do visuals accurately reflect the data? For example, images in the foreground of a photograph may look larger than those images in the background. Furthermore, a simple mountain icon may not adequately represent the difference between a mountain range at 5,000 feet and 10,000 feet.

Perspective. What facts and opinions are represented in this visual? Is a particular point of view most often represented? An illustration of a globe generally shows North America although there are many other views that could be presented. A visual representing Arizona often includes a Saguaro cactus even though this plant doesn't grow in all parts of the state.

Comparison. How does this graphic compare to other information that's been examined? Was the same or different data used? How do similarities and differences impact overall understanding? How does the method of presentation impact understanding? Which method best reflects the student's intent? For example, there's maybe space for only one diagram comparing the alligator and the crocodile. Would a Venn Diagram or labeled photo comparison be more effective? Each provides similar information, but each is presented in a different way.

Connections. How do the ideas in the graphic relate to each other? How do they relate to other ideas being presented? How do they address original questions posed by the inquiry? How do they support the conclusions being drawn in the communication? After examining many options, the concept map seems to do the best job showing the relationships among the characters in the novel *Of Mice and Men.*

The mature inquirer looks beyond the easy solution, common examples, and stereotypes to locate, integrate, or create unique ways for using graphics to represent ideas.

Designing and Creating Graphics

A high school student creates a list of pros and cons related to a summer internship, a second grader builds a Venn Diagram comparing birds and bats, and a team of middle school students take digital photos of the steps for a science experiment. They're all participating in graphic inquiry.

Starters. It is useful in some cases to provide students with prompts, templates, and resources to help them create graphics. Students could be provided with a *PowerPoint* or *Inspiration* template that has directions and a collection of photographs or clipart to stimulate thinking.

Tools. From markers and sticky notes to computer software and digital camera, a wide range of tools are available to student information scientists. Students should be helped to make good decisions about the best tool for a particular project. A piece of flip-chart paper and colored markers would work fine for creating a concept map as part of an idea generation session. If a group of students, however, from different class sections are working together, it might be more convenient to use the online tool *Thinkature* (http://thinkature.com) or *Gliffy* (http://gliffy.com). This website allows users in remote locations to collaborate on building a concept map (see Figure 3).

Composition. Like writing a poem, students need skills in composing visual communications. When using a digital camera, a student needs to consider the lighting, camera angle, depth of field, context, and other elements of composition. As the student edits the photographs, he or she may be cropping, extracting, or modifying the visual to best represent the idea for a particular audience.

In some cases, a graphic is created as part of the inquiry process, e.g., brainstorming or organization of evidence. At other times, a graphic is used as the final

product or as part of a culminating communication, e.g., a report or wiki page. In both cases, basic skills in graphic design and development are essential. Regardless of whether the student is creating a timeline of events as he reads a novel or building a pictorial chronology for a report on the history of satellite communication, the student inquirer needs to understand the function and creation of effective graphics.

The mature student information scientist creates effective, efficient, and appealing graphics during both the process of inquiry and as a product to communicate results.

Graphics, Learning, and the School Library Media Program

Because graphics can incorporate multiple formats of information, they appeal to many learning styles and intelligences. For example, young people with strengths in verbal-linguistic intelligence are drawn to charts and graphs emphasizing key words and lists of text, while those with logical-mathematical intelligence choose bar graphs, timelines, logic maps, and other numeric visuals. Maps, sketches, and photographs suit those with visual-spatial intelligence. The classification aspects of diagrams and comparison charts appeal to those with naturalistic intelligence. The use of graphics for goal setting and meta-cognitive activities is associated with intrapersonal intelligence, while the social aspects of collaborative planning for graphics is associated with interpersonal intelligence.

Graphic novels and comics have become particularly popular with visual learners. According to Will Eisner, "the reading process in comics is an extension of text. In text alone the process of reading involves word-to-image conversion. Comics accelerate that by providing the image" (1996, 5). Using software such as *Comic Life* helps young people create their own visually-rich stories. Scott McCloud, author of *Understanding Comics*, notes that digital comics can take virtually any size and shape (2000).

The Pride of Baghdad is a high school level graphic novel by Brian K. Vaughan focusing on the impact of the War in Iraq on zoo animals (DC Comics, 2006). This graphic novel may inspire teens to create their own visual stories focusing on the consequences of war (see Figure 4).

Figure 4

Because of their many versatile uses, graphics are helpful in differentiating instruction. Visuals can provide concrete examples for students who have difficulty with abstract concepts. In addition, these visuals can present information in a variety of ways to meet individual needs. A learner, for example, who has difficulty communicating ideas through writing may excel at the development of graphic communications. The role of the library media specialist, then, is to connect the wealth of visual resources and tools with meaningful, inquiry-based experiences.

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